principles of heating they have been led by this theory. In the furnace here shown, the purpose of the design was that the shell should be rolled upon the hearth of the furnace, being heated at the same time by the heat reflected or " *reverberated* " from the roof; accordingly the incandescent gases from the fireboxes, in which coke was burned, were passed through the free space under the arch of the furnace, to the working opening at the highest point of the arch. But the shells were not surrounded by the incandescent gases; instead they were placed in a pocket of

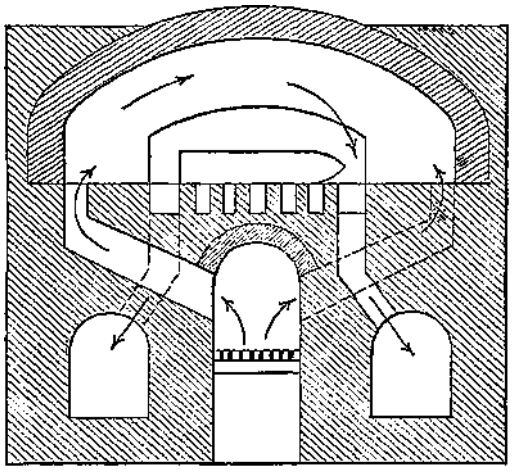

FIG. 103.

colder and stagnant gases which quickly absorbed any heat they might receive by " *reverberation.*[73]

The work of this furnace was very unsatisfactory. In addition, it was found desirable to substitute wood for the coke, as the latter fuel is costly in Russia. This furnace was reconstructed according to the author's design (Fig. 103). No change was made in the general arrangement of the furnace, but the direction of flow of the hot gases was reversed and the hearth was changed so that the shell rested on a number of parallel ribs of brick, a grid-iron hearth, arranged so that the colder gases were drawn off from the hearth by ports below the level of the shell into waste-gas flues. The furnace then worked

perfectly.